

**STRUCTURE AND METHOD FOR FABRICATING SEMICONDUCTOR  
STRUCTURES AND DEVICES UTILIZING THE FORMATION OF A  
COMPLIANT SUBSTRATE HAVING A NIOBIUM CONCENTRATION**

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Abstract of the Disclosure

High quality epitaxial layers of monocrystalline materials can be grown  
overlying monocrystalline substrates such as large silicon wafers by forming a  
10 compliant substrate for growing the monocrystalline layers. The compliant substrate  
includes an accommodating buffer layer comprising a layer of monocrystalline oxide  
having a niobium concentration that provides for substantial lattice matching of the  
accommodating buffer layer to the overlying monocrystalline material layer. The  
monocrystalline oxide of the accommodating buffer layer is selected to be lattice  
15 matched to the underlying monocrystalline substrate. The accommodating buffer layer  
may be spaced apart from the underlying monocrystalline substrate by an amorphous  
interface layer. The amorphous interface layer dissipates strain and permits the growth  
of a high quality monocrystalline accommodating buffer layer.

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